

Careers in Applied Mathematics in the Health Sciences

- Medical research relies on applied mathematics
 - Biostatistics: Analysis of experiments, evaluation of tests, planning trials, helping physicians
 - Bioinformatics: Gene analysis, gene-environment interactions, genetic epidemiology
 - Epidemiology: Patterns of disease prevalence, health information, health planning, rural issues
 - Data management: Working with large datasets, collecting data over the internet, continuous data collection
- Biostatistics
 - Typical project: HALT-PKD - Comparison of two medications for PKD vs 1 medication
 - Project scope: Persons 18-60, with PKD, randomized to one of two medication conditions and 1 of two BP target conditions
 - Project sites: One data center (Washington University), 7 client sites with patients
 - Data collection over the internet
 - TRAINING: MA in applied statistics/biostatistics – many good programs (Iowa, Kansas, Nebraska, Minnesota, Utah, UNC-CH, UPitt, Johns Hopkins, Harvard, Northwestern, SDSU)
- Bioinformatics
 - Typical project: Determine the genetic markers associated with exercise and diabetes
 - HERITAGE: Compare families in their response to exercise
 - Genetic markers are examined for father, mother, 1 child
 - Determine which genes are involved in the response to exercise
 - TRAINING: MGE, MA, MPH in bioinformatics/genetic epidemiology – fewer programs (Iowa, Case Western, Washington University, Univ Washington, Utah, Johns Hopkins, Harvard)
- Epidemiology
 - Typical project: Map the outbreak of H1N1 flu, and determine who characteristics of populations of susceptible persons
 - Project scope: Data are collected at physician offices, hospital ERs, walk-in clinics
 - Data are consolidated at national Disease center (CDC)
 - New methods: Map Google queries about “H1N1”, “flu”, “swine flu”
 - TRAINING: MPH at MANY fine institutions with SPH (Iowa, Kansas, Nebraska, UNC-CH, Johns Hopkins, Minnesota)
- Data management
 - Typical project: Large project involving data collected over time
 - DM: Monitor collection, assist in analysis, ensure accuracy and completeness, master data entry and data recovery tools
 - Internet-based data entry: Remote sites offer speedy collection, but some problems in the collection remotely
 - TRAINING: MA in applied statistics/MPH at many institutions

There are many opportunities in this area. Usually, the MA/MPH/MS is needed to be competitive.